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ABSTRACT

A manual format is used to explain: (1) the parts of a filmstrip projector, (2) threading procedures, (3) minor maintenance and repair techniques, and (4) purchasing hints. One-half of the manual is devoted to illustrations of equipment and material. (DAG)

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OPERATION AND MAINTENANCE

of the

35MM FILMSTRIP PROJECTOR

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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INTRODUCTION

Since the introduction of modern photography (about 1839), the projection of transparent images has been a popular form of entertainment. Today, the projection equipment is automatic and synchronized with sound.

The word, photography, is a Greek word meaning, "writing with light," and refers to any method of producing a visible image by the action of light on light-sensitive materials. The two methods of photographic reproduction are 1) printing the images on special paper (photographs), and 2) projection of the images onto an acceptable surface (walls, screens, etc.).

The filmstrip is a light projection image medium. The filmstrip is one of the most widely accepted and owned projection formats because of its economy, versatility, ease of operation, and light weight. The filmstrip is highly versatile: as a happy medium between still and motion formats; as a single frame or a series of interrelated images; used as a silent format or with sound; used for group or individual showings; used with transparencies. The versatility makes the filmstrip desirable for all media collections.

The average cost of a filmstrip projector begins as low as $65.00 for a standard model, or can be as high as $350.00 for more sophisticated models with external speakers. The projector can be operated manually by showing one frame at a time, or by push-button remote control, or automatically by a pulsed sync. The weight varies (approximately twenty-five pounds) and is manageable for most persons.

Shortly after the filmstrip began to function as a form of entertainment, its value as a lecture tool was discovered, and the role expanded. Today, we utilize the filmstrip as a means of entertainment, information, and education. A library can use filmstrips for a wide variety of programming, including children's story hours, art presentations, nature studies, and in conjunction with other media.

PARTS OF A FILMSTRIP PROJECTOR

The key to effective utilization of equipment is a basic understanding of the operation of the parts. This section provides diagrams and descriptive definitions of each part. Since several different shapes and models of filmstrip projectors are available, this section will describe those features most common to all filmstrip projectors. To increase the effective use of the filmstrip presentation, acceptable practices for the physical spacing of the projector, the screen, the sound system, and the audience should be followed.

The information in this section has been organized into six systems of functions within the projector:

1. Film transport system which moves the filmstrip
2. Threading system which moves the filmstrip properly
3. Control system which begins and ends all operations
4. Film projection system which creates the image
5. Film projection correction system which creates the best possible image
6. Sound system which reproduces the proper sound

Film Transport System

The filmstrip transport system moves the filmstrip past the light and the magnifier in the correct manner. The width and design of this system depends on the size and type of film material to be used.

Feed spindle holds the filmstrip by means of a curved tension metal clip. (This feature is common on most manual filmstrip projectors.)

Film holder is a cylindrical container in which the roll of filmstrip is placed (a common feature on the Dukane projectors).

Sprocket wheels are the wheels with regularly-spaced points designed to engage the sprocket holes in the filmstrip, the means for moving the filmstrip from one frame to the next.

Film carrier is the long silver chute behind the lens. The aperture is cut into the front and rear of this bracket to allow the lamp beam to pass through the filmstrip and lens onto the screen. Many film carriers are removable for easy loading and unloading of the filmstrip.

Film advance knob is the round knob located near the sprocket wheel at the end of the film transport. On several projectors, this knob must be depressed to advance the film. All projectors have the film advance knob.

Threading System

The importance of proper threading cannot be overstressed since it is the improper function of this system which causes the majority of film damage. Each filmstrip projector has a threading system unique to its design. All filmstrips are stored in cylindrical containers (there are no reels or spools). The filmstrip is wound into a roll to fit into the container.

Manual threading is the most common type of threading. The filmstrip is placed onto the projector and fed into the film carrier by hand until the focus frame appears on the screen.

Automatic threading requires the first series of frames to be manually fed through the film carrier until the sprocket wheel engages the filmstrip. The remote control or the automatic timer then advances the filmstrip.

Manual threading knob advances the filmstrip manually.

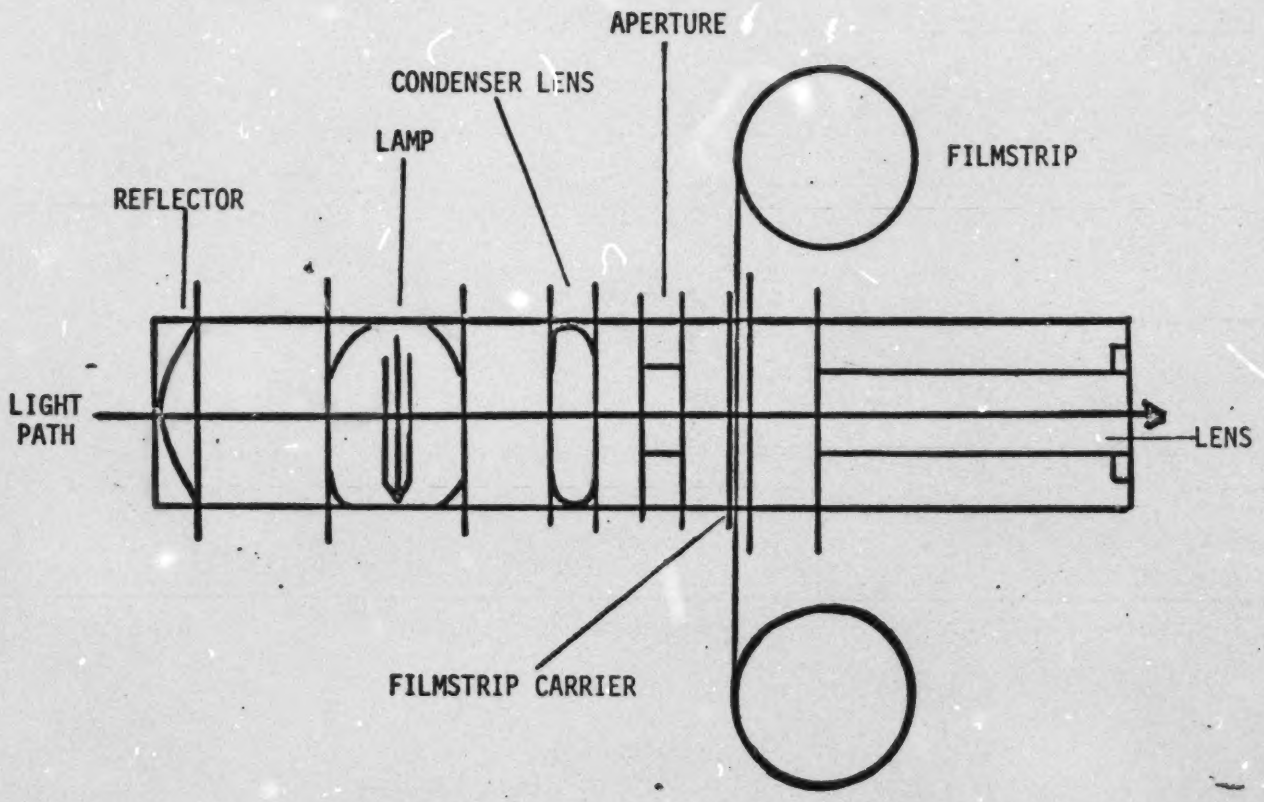
Control System

The control system turns the fan, lamp, and motor of the projector on and off.

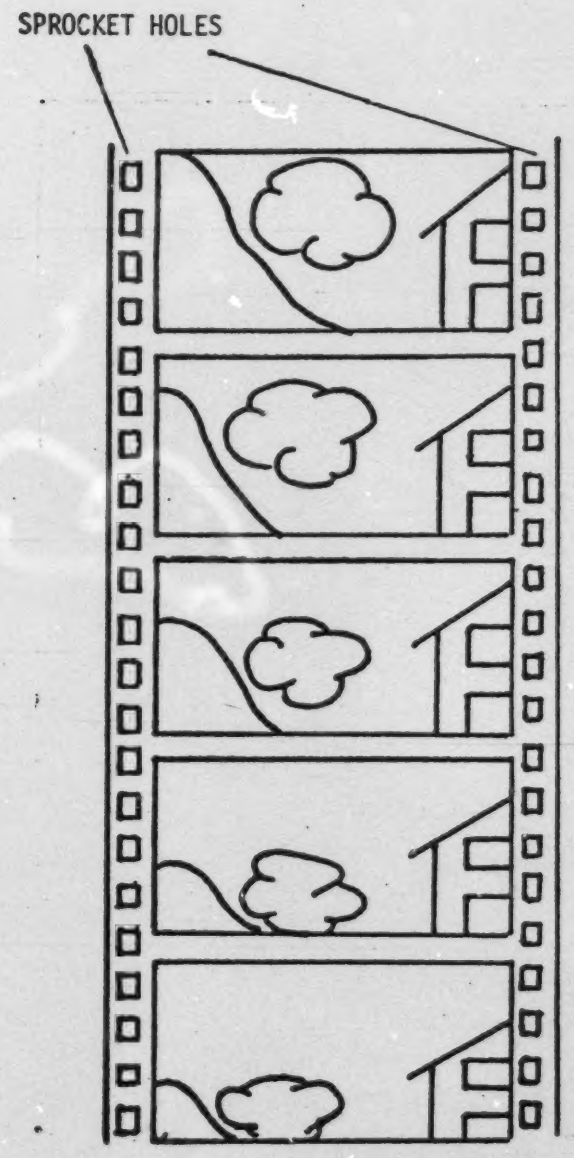
On-off switch turns the motor on or off. Many filmstrip projectors have a single switch for the motor, fan, and lamp.

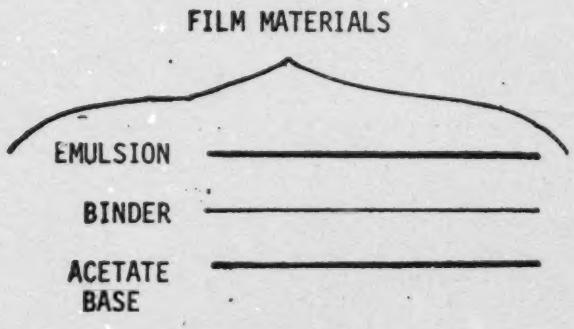
Lamp switch may be separate for warming or cooling the projector without burning the lamp. This feature extends the lifetime of the lamp.

UNIVERSAL CONCEPT OF PROJECTION

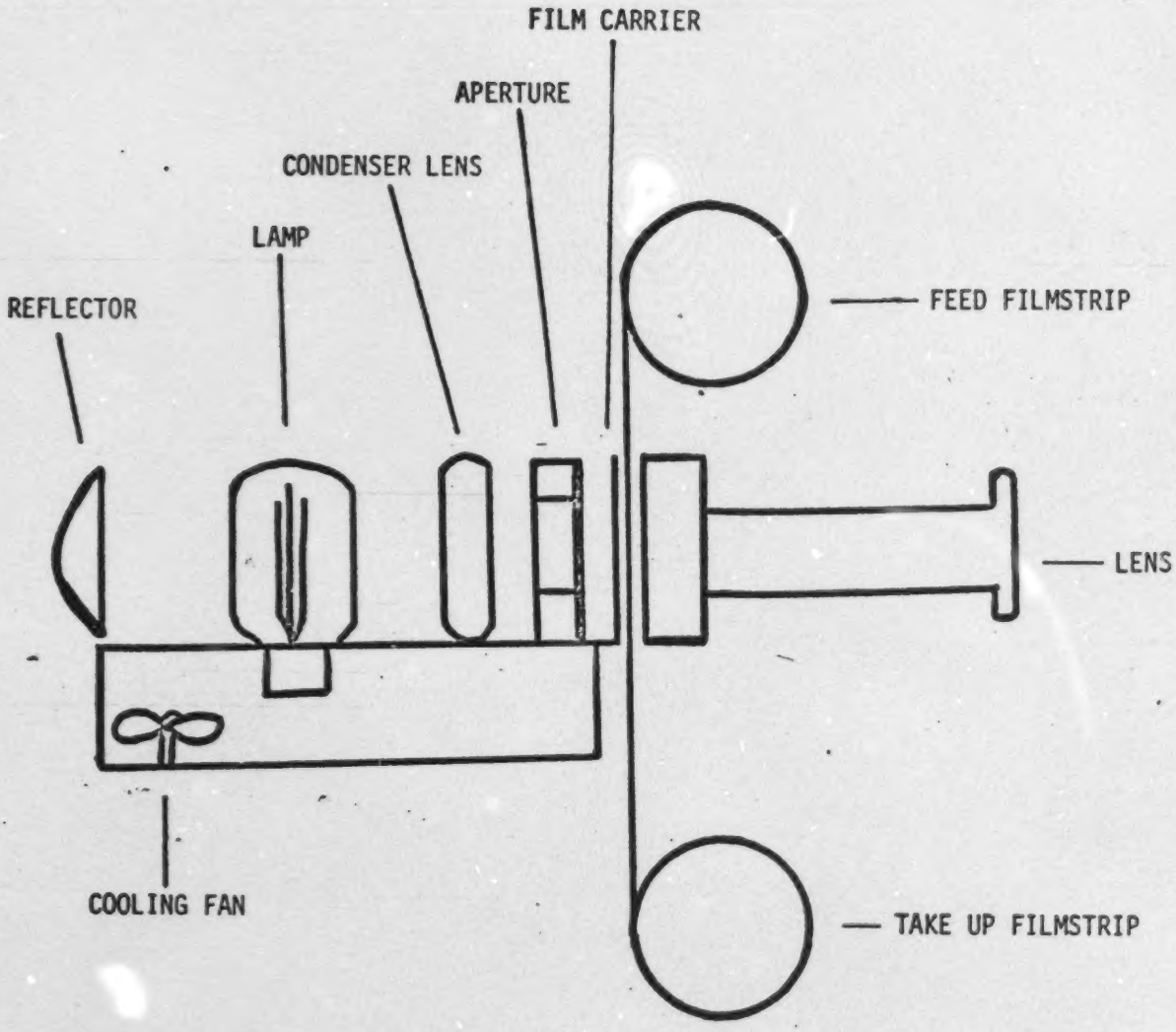


EXAMPLE OF 35MM FILMSTRIP

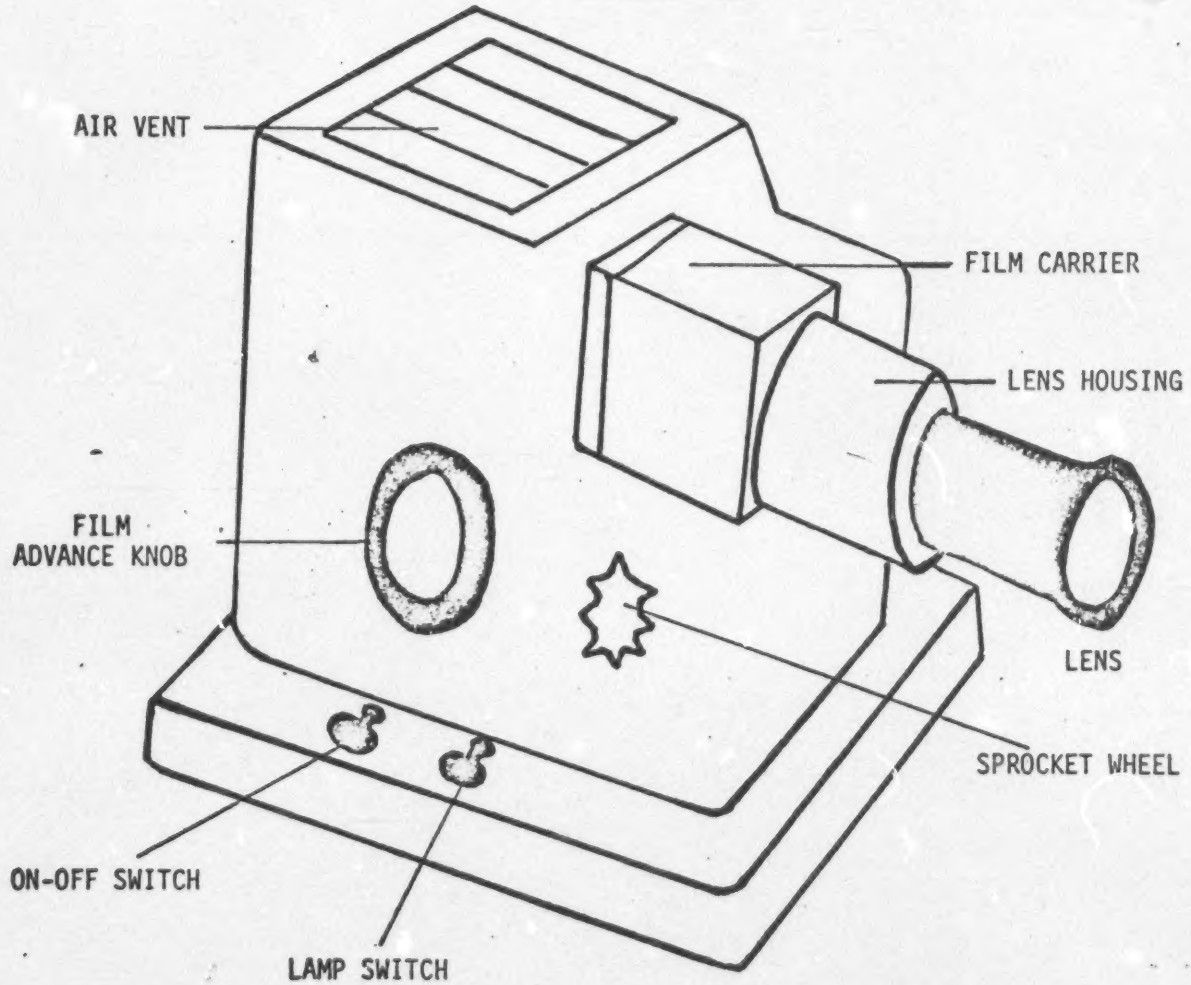




FILM TRANSPORT SYSTEM



STANDARD FILMSTRIP PROJECTOR



Volume control is found only on filmstrip projectors with built-in sound systems.

Remote control cord is a cord, six to ten feet long, with a socket on one end which fits into the projector and a control button on the other to change frames. It frees the projectionist to make verbal presentations away from the projector and interfering noise of the running motor.

Automatic timer advances the filmstrip at regular intervals. The projectionist simply turns on the projector and starts the filmstrip presentation.

Filmstrip Projection System

The filmstrip projection system operates similarly to other projection systems. The light travels in a straight line from the center of the lamp's reflector, through the condenser, the aperture, the filmstrip frame, and finally through the center of the lens.

Projector lamp for the filmstrip projector is identical to lamps in other projection devices. The lamp is glass enclosed and contact based and contains gas and filament coils.

Condenser lens is the thick oval glass in front of the lamp that reduces and condenses the light beam as it passes through. This lens is heat and shatter proof (until it touches a hot lamp or is dropped). It must be kept clean.

Objective lens on the filmstrip projector can be interchanged with other projector lenses as there is no difference in construction or purpose. The lens is color coated and is housed in a tube with curved and polished glass. Most filmstrip projectors are focused by turning this lens housing tube.

Film Projection Correction System

The filmstrip projector has only three corrective devices:

Framer device, usually a part of the manual filmstrip advance knob, centers the projected frame within the borders of the aperture similar to a picture in a frame. If the top or bottom line and part of another frame are projected on the screen, the framing device is turned until the image is correctly centered.

Horizontal knob raises the front of the filmstrip projector until the projected image is placed correctly on the screen. The projector should not be placed on books or other temporary supports; the projector may fall causing bodily injury or damage to equipment.

Focusing is usually accomplished by turning the lens housing tube on projectors with no focusing knob.

Sound System

Filmstrips that have sound are called synchronized sound filmstrips. No sound tracks are attached to the film base of a filmstrip; sound reproduction sources are on separate devices such as tape or phonograph records. There are two types of synchronized sound: the audible sound and the inaudible sound. There are three types of filmstrip projectors: the silent, the tape sound, and the phonograph record sound. Separate sound reproduction devices can be used with all filmstrip projectors. The sound reproducing devices are not necessarily part of the projector.

Audible sound is an audible signal that tells the projectionist to manually advance the filmstrip to the next frame.

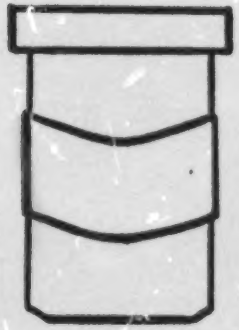
Inaudible sound originates from a "pulse-sync" signal recorded into a tape or record, and automatically advances filmstrip frames.

Pulse sync is the process of recording high or low frequency tones on magnetic surfaces. The tone itself is inaudible but activates the mechanism of a machine that is tuned to its frequency (i.e., 60hz-1000hz). The tone is the "pulse"; the synchronized action it causes in the operation of another piece of equipment is the "sync." This pulse tone is synchronized to the filmstrip advance mechanism and each time a pulse is emitted from the sound track, the filmstrip frame changes automatically to correspond to the narration.

Tape sound is reproduced from a standard audio cassette tape that has been produced for that filmstrip. (A built-in tape sound filmstrip projector is simply a filmstrip projector with a portable tape cassette player attached.)

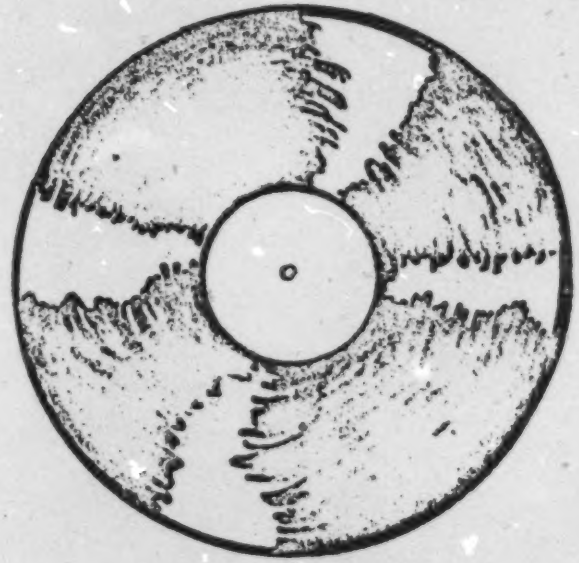
REMOTE
CONTROL CORD

AUDIO CASSETTE



FILMSTRIP CONTAINER

AUXILIARY
SPEAKER



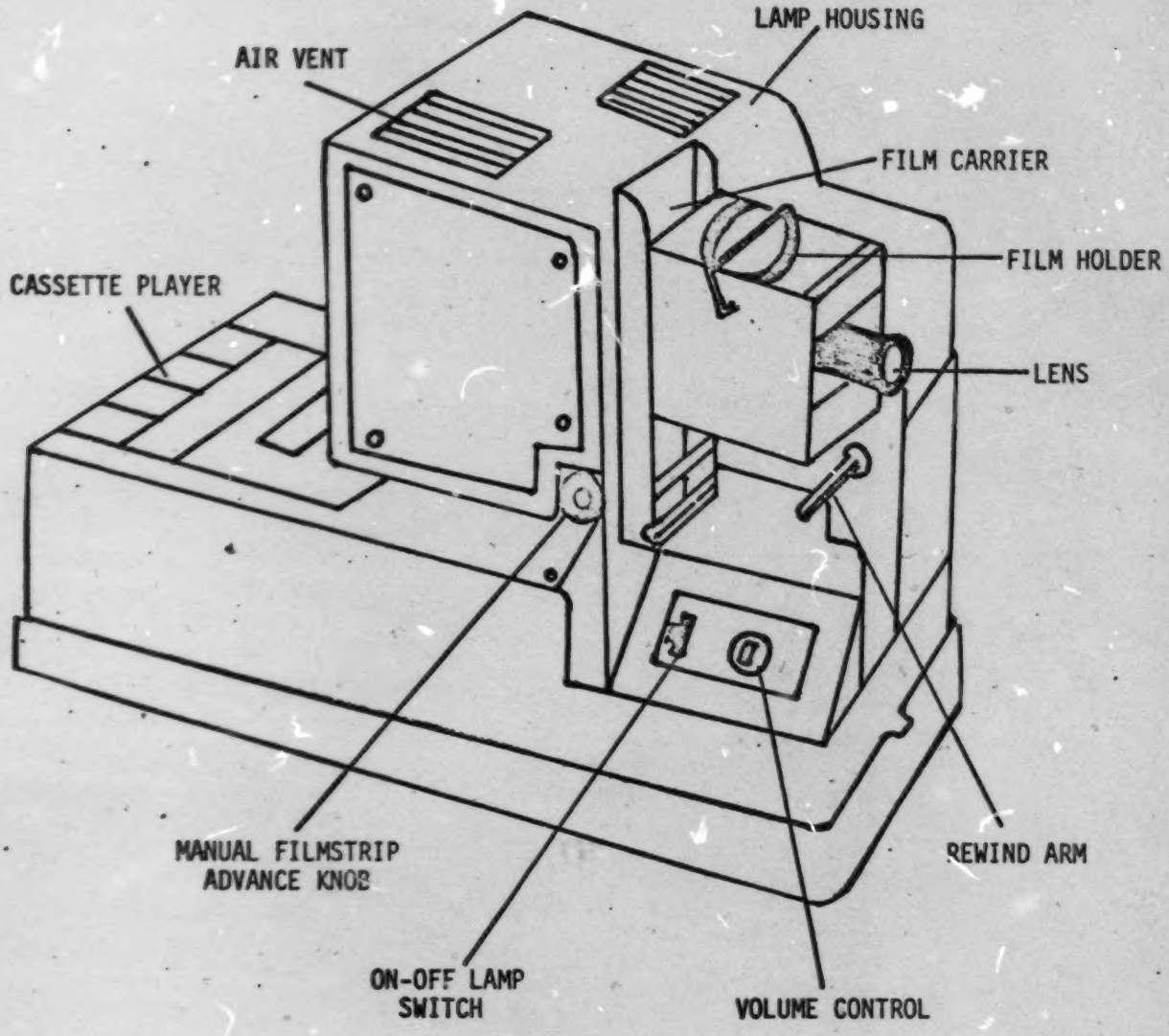
PHONODISC

FILMSTRIP ACCESSORIES

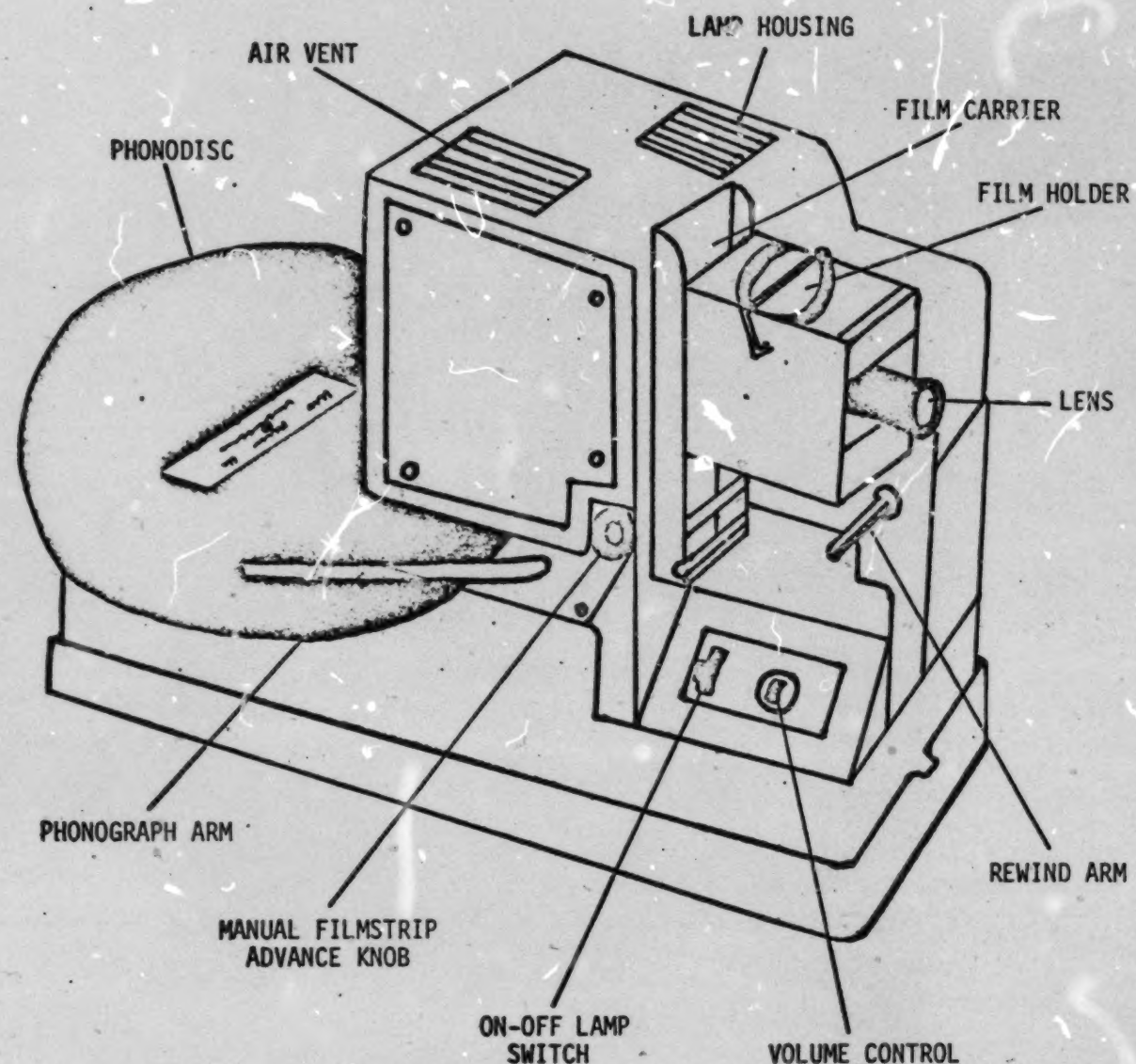
Phonograph record sound is reproduced from a standard phonograph player that has been attached to a filmstrip projector.

Silent filmstrip projector does not have a built-in sound reproduction mechanism. However, by utilizing the manual advance or remote control cord and a tape player or a phonograph player with a record or tape that has an audible signal on the sound track, the projectionist can have a sound filmstrip showing. The filmstrip frame is changed each time the signal is heard.

EXAMPLE OF CASSETTE FILMSTRIP PROJECTOR

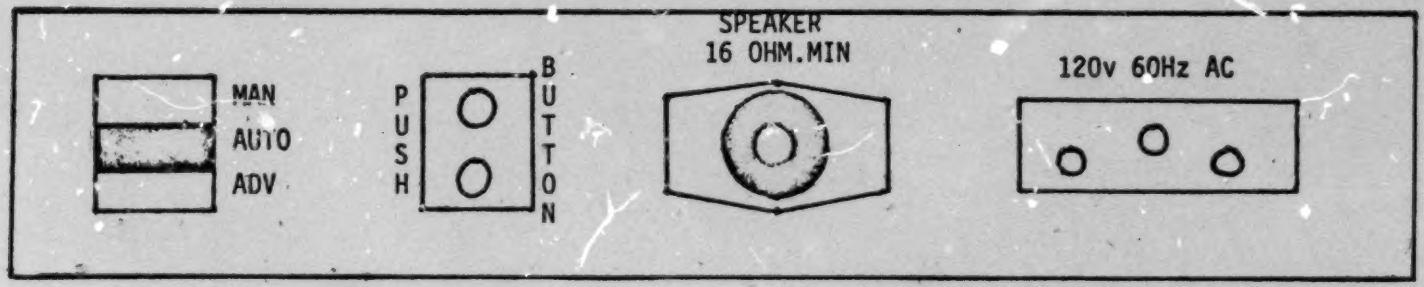


EXAMPLE OF PHONODISC FILMSTRIP PROJECTOR



EXAMPLE OF DUKANE FILMSTRIP PROJECTOR
BACK PANEL

120v 60Hz AC = Standard electric wall outlet into which the power cord is plugged



MAN = Manual operation by using audible signal and advancing frames by turning frame knob.

AUTO ADV. = Automatic advance by using inaudible signal side of cassette to advance each frame on cue.

PUSH BUTTON = Remote control cord operation by depressing a button a cue signal changes the frames.

SPEAKER 16 OHM.MIN. = The extra speaker cannot be 8Ohm. or 120 OHM; it must be 16 OHM. or less.

THREADING PROCEDURES

There are two threading procedures for the filmstrip projector:

1. The end of the outer layer of the filmstrip is inserted upside down into the film carrier until the sprocket wheel engages the sprocket holes, or the word, "focus," appears on the screen. With this method, the filmstrip must be rewound after each showing.

2. The filmstrip is placed into a cylinder; the inside layer of the film is pulled up and the end placed into the film carrier.

MINOR MAINTENANCE AND REPAIR TECHNIQUES

Filmstrip Rolls

A filmstrip should not be touched on its flat surfaces (the skin's moisture will leave imprints on the chemicals), but grasped by its edges.

A filmstrip should not be rewound tightly because the film's surface will be scratched (known as "cinching" a film).

Filmstrips should be stored in a cool dry place since heat and cold affect the chemicals and dye on the film.

Each filmstrip container should be marked in a place that is easily seen. Note the title of the filmstrip.

Quality film cleaning liquid, such as the type used to clean movie films, should be used on filmstrips.

A damaged filmstrip can be repaired with film cement or 37mm splicing tape. Other adhesive tapes should not be used because they lack sprocket holes and reduce the transparency of the film.

Cassette Tapes

Standard audio cassette tapes should be treated and stored in the same manner as filmstrips. (If possible, a duplicate tape should be made and the master tape kept for emergencies.)

The tape cassette player can be cleaned with rubbing alcohol and a head cleaning tape.

Phonograph Records

A record should be stored on its edge away from heat. The surface is cleaned with a soft lint-free cloth and rubbing alcohol.

Projector Lamps

Several spare lamps should be kept on hand. The lamp surface should be kept clean.

PURCHASING HINTS

Purchasing a projector of any type is a major expenditure for a library. Listed are several suggestions that may be helpful in selecting a usable piece of equipment.

Clarity of image: determined simply by projecting an image on the screen, focusing the image as clearly as possible, and checking the colors for lifelike tones.

Ease of operation: the knobs are easy to reach and have sufficient space for handling; the cover latches work smoothly; the lens moves easily during the focusing; the controls are push buttons, knobs, or switches.

Cooling system: sufficient to cool the lamp and runs quietly.

Lamp: easily accessible for changing.

On-off lamp switch: durable and easily removed for repair. More desirable is an on-off switch separate from the lamp so the lamp can be turned off when not in use and the fan can pre-heat or cool the projector.

Ease of focusing: accomplished by a focus knob or a smoothly moving lens housing tube. Many lens housing tubes are smooth and need only to be moved back and forth; other lens housing tubes are threaded and require rotating.

Weight of the projector: affects its portability and sturdiness. A heavy projector limits usage to persons able to move it; a light projector may be easily knocked over.

Warranty and service: should be available from a reliable source within a reasonable period of time and within reasonable shipping distance.